

DEPARTMENT OF CYBERNETICS AND ARTIFICIAL INTELLIGENCE

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1 DEPARTMENT'S PROFILE

The Department of Cybernetics and Artificial Intelligence (DCAI) provides undergraduate and graduate training in two fields of study: (1) Control Engineering and Automation, and (2) Artificial Intelligence. Students in the department obtain detailed knowledge about control theory and artificial intelligence methods and they develop skills for creative application of basic and advanced intelligent techniques in a wide range of industrial and non-industrial areas.

The main research topics at DCAI are intelligent methods and algorithms for control and modelling of large-scale systems, risk-sensitive diagnosis of uncertain systems, computational intelligence techniques for modelling of intelligent systems and in other applications, intelligent decision support systems, pattern recognition, and knowledge technologies for information retrieval and knowledge management. DCAI is also involved in continuing education.

Past and present of DCAI: The predecessor of the current DCAI was founded in 1964. The current name, Department of Cybernetics and Artificial Intelligence,



was adopted in 1989. Currently DCAI has 21 staff members, 15 internal and 17 external Ph.D. students. There are 3 sections within the department: Control Systems, Artificial Intelligence, and Automation Systems. DCAI is involved in a number of research and educational projects. The following types of projects were under way in 2003: 4 European IST projects (1 research grant and 3 thematic networks), 1 US-Slovak Twinning project, 1 bilateral Slovak-Austrian and 2 bilateral Slovak-Czech research grants, 1 grant awarded by Agency for Science and Technology, 6 grants awarded by Science Grant Agency and 3 institutional grants.

2 STAFF

Professors:

prof. Ing. Dušan Krokavec, CSc.
prof. Ing. Ladislav Madarász, CSc.
prof. RNDr. Eva Ocelíková, CSc.
prof. Ing. Ján Sarnovský, CSc.
prof. Ing. Peter Sinčák, CSc.

Associate Professors:

doc. Ing. Július Csontó, CSc.
doc. Ing. Anna Filasová, CSc.
doc. Ing. Ján Jadlovský, CSc.
doc. Ing. Marián Mach, CSc.
doc. Ing. Tomáš Sabol, CSc.
doc. Ing. Iveta Zolotová, CSc.

Assistant Professors:

Dr. Ing. Vratislav Hladký
Ing. Anna Jadlovská, PhD.
Ing. Rudolf Jakša, PhD.
Ing. Norbert Kopčo, PhD.
Ing. Ján Liguš, PhD.
Ing. Kristína Machová, CSc.
Ing. Ján Paralič, PhD.
Dr. Ing. Ján Vaščák

Senior Scientists:

Ing. Marián Bučko, CSc.
Ing. Marek Duľa
Ing. Peter Kostelník
Ing. Jana Ligušová

Technical Staff:

Imrich Balogh
Tatiana Baňasová
Mária Feješová

Ph.D. Students:

Ing. Rudolf Andoga	Ing. Tomáš Kasanický
Ing. Peter Bednár	Ing. Ján Kašprišin
Ing. Peter Butka	Ing. Juraj Klacik
Ing. Peter Engler	Ing. Vratislav Kováč
Ing. Juraj Horváth	Ing. Peter Kostelník
Ing. Slavomír Hudák	Ing. Stanislav Laciňák
Ing. Jozef Chvál	Mgr. Eva Schwaradyová
	Ing. Adrián Tóth

3 EQUIPMENT

3.1. Teaching and Research Laboratories

- Centre for Intelligent Technologies (joint research unit between Department of Cybernetics and Artificial Intelligence and Institute of Computer Science, Slovak Academy of Science) focused on promotion of intelligent technologies
- Laboratory of Information Systems (L-535)
- Laboratory of Distributed Control Systems - ROCKWELL AUTOMATION LABORATORY (L-536)
- Laboratory of Complex Systems Control (L-513)
- Laboratory of One-Chip-Computers (L-509)
- Artificial Intelligence Laboratory (LUI)
- Laboratory of Speech and Pattern Recognition (V-147)
- Knowledge Technologies Laboratory (V-101a)
- Signal Processors Laboratory (V-101b)

3.2. Special Measuring Instruments and Computers

2 x RISC stations IBM RS-6000, server DEC ALPHA 1000/200, about 30 PCs, programmable logic automates of various types (PLC-5/20E, SLC 5/4, SLC-5/03, TSX-47/40, TSX-17, SIMATIC S5-90U, SIMATIC S5-95U), far connectors, industrial visualization terminals and intelligent measurement elements, block of far I/O based on modules SLC, industrial terminal Panel-View-550, 3 x analogue computers MEDA-50, three-phase drive Rockwell-Automation, model for measurement and regulation of hot water supply, asynchronous drive, resources for recognition of black and white images: black and white camera MINILUX SUPER CCTV CAMERA and CCD CAMERA CCD-4230A, program resources based on AI elements, frame-grabber SHARK 22n SHT G22.N1 with PHILIPS SAA 7110 WP video-processor; resources for infrared images recognition: AGA TERMOVISION SYSTEM 608, camera, remote control, black and white and colour monitor, PC-LabCard 812, 2 x computers SUN SPARC station 20, , 8 x single-chip-computer configurations based on I-80552, 10 x set TEMS-51 LAB based on I-8031, three application on-chip-computer configurations 196 LAB based on I-80196, 3 x 3-channel oscilloscope, 3 x generator of signals, 3 x variable voltage supply, Lego mind-storm system, 4 x kit based on ADSP - 2100 signal processor; 4 x kits based on ADSP - 2181 signal processor.

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Identification and Modeling	5 th	2/3	Filasová
Foundations of automatic control	5 th	2/2	Filasová
Artificial Intelligence	5 th	3/2	Sinčák
Linear and Non-linear Systems Control Theory	5 th	3/2	Madarász

Simulation Programming Tools Seminar	5 th	0/2	
Object and Component Systems	5 th	1/3	Jakša
Introduction to Neuroscience	5 th	2/2	Kopčo
Introduction to Cognitive Science	5 th	2/2	Kopčo
Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Cybernetics and Management	5 th	2/2	Sarnovský
Stochastic Processes in Dynamic Systems	6 th	2/2	Krokavec, D.
Single-chip Microcomputers in Control	6 th	2/3	Jadlovský
Knowledge Systems	6 th	3/2	Machová
Elements of Control Systems	6 th	2/2	Hladký
Signal Processors Applications Seminar	6 th	0/2	
Applied Programming Seminar	6 th	0/2	Jakša
Protocols and Interfaces	6 th	2/2	Jadlovský
Computer Vision	6 th	2/2	Zolotová, Tomori
Scheduling and Logistics	6 th	2/2	Paralič, J.

4.2. Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Computer Tools for Technological Systems Control	7 th	2/3	Jadlovský
Theoretical Foundations of Artificial Intelligence	7 th	2/3	Sabol
Neural Networks	7 th	3/2	Sinčák
Discrete-time System Theory	7 th	3/2	Krokavec, D.
Database Management System Applications	7 th	3/2	Ocelíková
Machine Learning	7 th	2/2	Machová
AI Programming Languages Seminar	7 th	0/2	Paralič, J.
Control System Design Seminar	7 th	0/2	
Fuzzy Systems in Control	7 th	2/2	Vaščák
Intelligent control networks	7 th	2/2	Liguš
Robot Control Systems	7 th	2/2	Kováč
Optimal and Adaptive Control Theory	8 th	3/2	Sarnovský
Multicriterial Decision Making	8 th	3/2	Ocelíková
Evolutionary Algorithms	8 th	3/2	Mach
Intelligent Sensor Systems	8 th	3/2	Krokavec, D.
Control and Visualization of Processes	8 th	2/2	Zolotová

Control and Artificial Intelligence	8 th	2/2	Jadlovská
Knowledge Management	8 th	2/2	Paralič, J.
XML Technologies Seminar	8 th	0/2	Mach
Online Identification	8 th	2/2	Krokavec, D., Filasová
System Analysis and Synthesis	8 th	2/2	Madarász
Robust Control	8 th	2/2	Filasová
Information Transmission	8 th	2/2	Krokavec, D.
Computational Neuroscience	8 th	2/2	Kopčo
Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Biocybernetics	9 th	3/1	Csontó
Complex Systems Control	9 th	3/2	Sarnovský
Complexity and Decision Making	9 th	2/2	Madarász
Distributed Control Systems	9 th	2/3	Jadlovský
Dynamic Systems Diagnostics	9 th	3/2	Krokavec, D.
Speech Recognition	9 th	2/2	Krokavec, D.
Neuro-fuzzy Systems	9 th	2/2	Sinčák
Project Management	9 th	2/2	Sabol
Agent Systems	9 th	2/2	Paralič, M., Sabol
Electronic Commerce	10 th	3/2	Sabol, Kováč

4.3. Undergraduate and Graduate Study for Foreign Students (In English Language)

All subjects listed in previous two subsections are offered also In English language for foreign students.

5 RESEARCH PROJECTS

- Web Technologies Supporting Direct Participation in Democratic Processes (WEBOCRACY)*, European Commission within the *IST Program (5th Framework Program)*, IST-1999-20364, collaboration: Faculty of Electrical Engineering and Informatics, TU Kosice, SK, The School of Computing & Information Technology, University of Wolverhampton, UK, Department of Information Systems, University of Essen, D, JUVIER s.r.o. - SK, Citec Information, Citec Engineering Oy Ab, Vaasa, FIN, City ward Tahanovce, SK, City ward Dargovskych hrdinov, SK, Wolverhampton Council, UK, duration: 2000 – 2003, web page: <http://esprit.ekf.tuke.sk/webocracy/>, members: Tomáš Sabol (co-ordinator), Marián Mach, Ján Paralič, Róbert Kende, Ján Hreňo, Peter Macej, activity: Project aims to empower citizens with innovative communication, access and voting systems supporting increased participation in democratic processes. This organizational objective is achieved through scientific objectives, which are of technical and methodological nature. Technical objectives involve design and development of a Web-based system Webocrat. Webocrat will support: communication and discussion, publication of documents (incl. notices for competitive tendering), browsing and navigation, voting, intelligent retrieval (access to requested documents), calculation of summaries/statistics. All functions will be supported by knowledge model

module. The methodological objectives are focused on development of a methodological framework and organizational practices for development and management of systems providing on-line support to public administration (PA) services.

- *European Network of Intelligent Technologies*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-29207, coordinator: Free University Amsterdam, The Netherlands, Computational Intelligence Group (CIG) is active node in this international project. Prof. Sinčák is a member of Technology Transfer EUNITE committee and is in charge of competition activities within the EUNITE. The CIG has organized the world-wide competition about electricity load forecast. The full information about this competition including the results can be found on Web page – <http://neuron-ai.tuke.sk/competition>. It was an interesting contribution to the problem of prediction using intelligent technologies. There are number of activities in EUNITE and their Web page is <http://www.eunite.org>.
- *Thematic Harmonisation in Electrical and Information Engineering in Europe (THEIERE)*. Thematic network, European Commission, Project Nr. 10063-CP-1-2000-1-PT-ERASMUS-ETNE, coordinator: Universidade Tecnica de Lisboa, Portugal, web page: <http://www.eaeeeie.org/theiere/> Main aim was to get a harmonisation of the curricula in EIE throughout Europe in order to facilitate the exchanges of knowledge, students and teachers. This harmonisation will make possible the establishment of common accreditation, crediting and certification procedures.
- *European Knowledge Management Forum*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-26393, coordinator: BIBA (Bremer Institut für Betriebstechnik und angewandte Arbeitswissenschaft an der Universität Bremen), Germany, web page: <http://www.knowledgeboard.com/>
- *Ontology-based information exchange for knowledge management and electronic commerce (OntoWeb)*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-29243, coordinator: Free University Amsterdam, The Netherlands, web page: <http://www.ontoweb.org/>
- *WDA 2003 (5th Student Workshop on Data Analysis)*, bilateral Slovak-Austrian research project, duration: 2003, members: Ján Paralič and Andreas Rauber (Vienna Univ. of Technology), activity: After rich experiences gained during the last three years of WDA workshops focused mainly on text data analysis and text mining techniques, the focus of this workshop remained in the text document collections domain, but made it much more advanced in the sense that the newest approaches from the domain of knowledge technologies, ontologies (TUK competencies), as well as unsupervised techniques for text categorization and new web archiving techniques (VUT competencies) were further combined, implemented and tested on predefined text data sets. Moreover, some natural language processing techniques were applied as well.
- *Computation of sound source location in ordinary, reverberant spaces: Experiments and models*. The US National Academy of Sciences' Twinning Program with Poland and Slovakia for 2003-2004. Collaboration between Norbert Kopčo and Barbara Shinn-Cunningham from Boston University.
- *Robust Model Predictive Control Systems*. Project of Slovak – Czech Inter-Government Scientific-Technical Cooperation, No. 072/03, duration: 2002-2003, members: Anna Filasová, (project leader), Dušan Krokavec, Peter Engler, Ján

Kašprišin. Activity: The scientific-technical project goals are focused on the methods for uncertainty frame specification subject to constrain quantification in the criterion and manipulated input and outputs, on the robustness analyze algorithms for model predictive control of uncertain and non-linear systems, as well as on the fault tolerant design of robust model predictive control systems. The terminal research targets are connected with on-line algorithms based on analytical redundancy for robustness analyzes, quantification and uncertainty formalisms in predictive control tasks, and robust tolerance tests.

- *Recognition and Objects Interpretation Methods in Information and Control Systems for Decision Support*. Slovak-Czech scientific and technological co-operation project No. 132/087, members: Eva Ocelíková (project leader), Iveta Zolotová, Ján Krištof, Ivan Mesarč, Andrej Turčan. Collaboration with Institute of Theory and Automation, Academy of Sciences of the Czech Republic. Duration 2002 – 2003.
- *Modelling, Control and Simulation of Distributed Production System*, Agency for Science and Technology No. APVT 51-011602, members: Ján Sarnovský (project leader), Ján Jadlovský, Iveta Zolotová, Anna Jadlovská, Ján Liguš, Vratislav Hladký, Jana Horanská activity: The goal of project is to analyze discrete production processes as distributed system, to design tools for control production with minimal requirements of hardware and software of information and control system; these requirements enable simple application without big input investments. The object of research is production systems with definite level of intelligence and with control systems in which is implemented communication among subsystems of control systems by help of data communication networks. The goal is to create the system for modeling, control and simulation of elements of network control systems, to design optimal structure of elements of control systems as well as the decision strategy at failures of network control systems. Especially the subgoals of project are: design of methods of modeling and control discrete events dynamic systems using Petri nets and state diagrams for supervisory control, design of supervisory control methods, development of new strategies for control systems at the failures of communication network.
- *Multiagent Intelligent Control of Large-Scale Systems*, Scientific Grant Agency project No. 1/9032/02, duration: 2002 – 2004, members: Ján Sarnovský (project leader), Ladislav Madarász, Ján Jadlovský, Peter Sinčák, Anna Filasová, Anna Jadlovská, Vratislav Hladký, Ján Liguš, Ján Vaščák, Zuzana Dzurňáková, Marián Bučko, Peter Benko, Jana Horanská activity: The goal of the project is the research and design of algorithms and methods of control and decision of automatic control systems, namely using modern paradigm of multiagent approached to control of large-scale systems using the principles and methods of artificial intelligence. The main goal is specified by the following sub goals: (1) Creating models of large-scale systems, namely from the viewpoint of modern approaches to control of subsystems, which are represented as agent model – hybrid dynamical subsystem model; (2) Formalization of control and decision processes using non-classical methods (fuzzy logic, neuron sets, etc.); (3) Decentralized methods and algorithms of control and decision in large-scale dynamic systems (decentralized fuzzy control, decentralized decision processes); (4) Programming means of intelligent control and decision for implementation of intelligent control agent in large-scale systems. Implementation of algorithms of control and decision in the hierarchical distributed computers systems at the real laboratory physical objects.

- *Methods and Tools for Decision Support Systems with Emphasis on Pattern Recognition*, Scientific Grant Agency project No.1/9031/02, duration: 2002 – 2004, members: Eva Ocelíková (project leader), Iveta Zolotová, Ladislav Madarász, Ján Jadlovský, Ján Krištof, Zdeno Orinčák, Andrea Julényová, Jana Ligušová, Juraj Galko, Ivan Mesarč, Andrej Turčan, Erna Demjénová, Branislav Mihaľo, Szappanos Tibor, activity: Project focuses on design of new and modified methods and tools in decision support systems with emphasis on pattern recognition. It includes integrated chain of tasks starting with data acquisition, pre-processing and storing of input data, throughout knowledge discovery, to its presentation into decision-making link in a suitable user interface. The attention will be focused on features of extraction and selection, classification methods and composite classifiers. From latest information technologies, emphasis will be put on software components and Internet technology. Project implements theoretical-experimental analysis and integration of tools into the application areas for control of technological processes (situation control, SCADA/HMI systems, intelligent control and information systems), for ecology (remotely sensed data) and for medicine (cardiovascular illnesses, bio-medical images).
- *Risk-Sensitive Diagnosis of Uncertain Systems*, Scientific Grant Agency project No.1/9028/02, duration: 2002 – 2004, members: Dušan Krokavec (project leader), Anna Filasová, Vratislav Hladký, Peter Engler, Ján Kašprišin. Activity: Project is focused on the fault-tolerant system design and the research is undertaken in the specific areas of fault detection and isolation, control system reconfiguration and diagnosis of non-linear as well as uncertain dynamic systems. The focal scientific points are in the development of methods and algorithms for risk-sensitive and risk-neutral estimation of residuals in robust system diagnosis and for risk-sensitive control reconfiguration. The terminal scientific objectives are applied-oriented computational methods for control of uncertain dynamic systems, appropriated hybrid procedures associated with residual generation, fuzzy-neural decision making and stochastic fault modeling, as well as sensitivity and robustness analyses of system fault diagnosis.
- *Modelling the Intelligent Systems with tools based on Computational Intelligence*, Scientific Grant Agency project No. 1/9296/02, duration: 2002 – 2004, members: Peter Sinčák (project leader), Ján Vaščák, Marcel Hric, Daniel Novotný, Peter Kostelník, Marek Šamulka, Miroslav Hudec, Adrián Tóth, Vratislav Kováč, activity: The project deals about Intelligent Systems and their application. The area of study includes neural, fuzzy and evolutionary approaches which are combined in the hybrid systems. The project is based on theoretical aspects of these tools and application area is on Financial Cybernetics (collaboration with Tatrabanka a.s.) and with Slovak Power Engineering Company a.s. . The project covers also problems of intelligent and cognitive control, prediction problems and learning-like pattern recognition systems.
- *Artificial life simulators and their application*, Scientific Grant Agency project No. 1/8135/01, duration: 2001 – 2003, members: Július Csontó (project leader), Marián Mach, Jozef Chvál, Martin Palko, Marek Polák, Peter Zvirinský; activity: The project is directed towards A-life simulation methods and their application. The aim is to create specialized simulators of different initial bases (Swarm system, Lindenmayer systems, evolutionary algorithms), which take into consideration the requirements of particular application fields. The core of the project will be the utilization of these simulation tools in solving a relatively wide

scale of practical tasks: monitoring the global ecosystem behavior, utilization of algae in eliminating heavy metals from water, monitoring the effect of signal spread in plants on their morphogenesis, data mining, prediction tasks and constraint problem solving.

- *Knowledge Technologies for Information Acquisition and Retrieval*, Scientific Grant Agency project No. 1/8131/01, duration: 2001 – 2003, members: Marián Mach (project leader), Július Csontó, Tomáš Sabol, Ján Paralič, Peter Macej, Kristína Machová, Slavomír Hudák activity: The project is focused on using knowledge modeling methods for solving information acquisition and information retrieval tasks. It is based on creating domain models in the form of conceptual models of different application areas. Elements of these models enable to represent a context of textual and non-textual documents in an explicit way. Within this framework the focus of the project activities is on: building of domain models, manual and automatic annotation of documents based on a particular domain model, retrieval of relevant documents and/or relevant parts of these documents, categorization and clustering of textual documents, and automatic generation of document abstracts.
- *Monitoring Real and Supervisory Control of Simulated Processes - Virtual Laboratory of Intelligent Information and Control System*, Cultural and Education Grant Agency project No. 3/120603, duration: 2003 – 2005, members: Iveta Zolotová (project leader), Eva Ocelíková, Ján Liguš, Ján Sarnovský, Jana Ligušová, Anna Jadlovská, Ján Jadlovský, Vratislav Hladký, Ladislav Madarász, Marek Duľa, Stanislav Laciňák, Juraj Horváth, activity: The project is focused to design and realisation of real (local) and virtual (remote) model of IICS with three level (process, supervisory, information). There is an internet industrial portal for Web Based Training - <http://theiere.fei.tuke.sk/module/OtherHtml/voyager.htm>, <http://torysa.fei.tuke.sk/suitevoyager>. Project is compatible with European project THEIERE.
- *Robust Predictive Control Systems Based on Models*, Institutional project of FEI TU Košice No. 4426, duration: 2003 – 2005, members: Anna Filasová (project leader)
- *Visual Information in Control and Decision*, Institutional project of FEI TU Košice, No. 4444, duration: 2003 – 2005, members: Iveta Zolotová (project leader), Juraj Hudák, Marek Duľa, Eva Ocelíková, Ján Jadlovský, Ján Liguš, Jana Ligušová, Erna Demjénová, Tibor Szappanos, Tatiana Baňasová, Mária Feješová and students. activity: The aim of the project is to design and develop some methods and applications with the using visual information in control and decision support.
- *Design and implementation of a departmental web application*, Institutional project of FEI TU Košice No. 4437, duration: 2003 – 2005, members: Ján Paralič (project leader), Peter Bednár, Peter Butka and students. activity: The aim of the project is to design and develop a universal departmental web application with role-based access control mechanism for distributed web site management, intelligent retrieval mechanism and possible extensions towards web services.

6 CO-OPERATION

6.1. Co-operation In Slovakia

- Department of Biophysics IEP Slovak Academy of Science - DB IEP SAS
- Department of Automatic Control Systems Bratislava – DACS
- Slovak University of Technology, Bratislava
- Institute of Control Theory and Robotics Slovak Academy of Science in Bratislava
- University of P.J. Šafárik, Košice
- Economic University, Faculty of Business Economics, Košice
- The City of Košice
- Local Authority Košice - City ward Ťahanovce
- Local Authority Košice - City ward Dargovských hrdinov
- Tatrabanka, a.s.

6.1.1. Visitors to the Department

- prof. Imre Rudas – Polytechnic Budapest, Hungary
- prof. Vladimír Kvasnička, DrSc. – STU Bratislava
- Dr. Dana Klimešová, PhD. – UTIA Czech Academy of Sciences, Prague
- Dr. Dipl.-Ing. Andreas Rauber – Vienna University of Technology, Austria
- Prof. Günther Pernul – University of Regensburg, Germany
- Assoc. Prof. Peter Burden – Wolverhampton University, UK

6.2. International Co-operation

- University of Wolverhampton, United Kingdom
- The Open University, Knowledge Media Institute, United Kingdom
- University of Vaasa, Finland
- Helsinki University of Technology, Dipoli, Finland
- Vienna University of Technology, Austria
- University of Regensburg, Germany
- CITEC, Finland
- Wolverhampton City Council
- Hearing Research Center and Dept. of Cognitive and Neural Systems, Boston University, USA
- University of Dortmund, Germany
- Tokyo Institute of Technology, Japan
- Kyushu Institute of Technology, Japan
- Department of Informatics, Technical University, Ostrava, Czech Republic
- Department of Control Systems and Instrumentation, Faculty of Mechanical Engineering Technical University of Ostrava, Czech Republic
- Department of Software Engineering, Vienna University of Technology, Austria
- Department of Cybernetics, Czech Technical University Prague, Czech Republic
- Department of Control Engineering, Czech Technical University, Prague, Czech Republic
- Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, Prague, Czech Republic
- Faculty of Mechanical Engineering, Department of Automation, Institute of Information, University of Miskolc, Hungary
- Budapest Polytechnic, Hungary
- Budapest University of Technology and Economics, Hungary
- California Institute of Technology, Jet Propulsion Laboratory (Dr. Antal, K.

- Bejczy), USA, California
- Hungarian Academy of Sciences, Computer and Automation Research Institute, Hungary (prof. Gyorgy Kovács)
- Bay Zoltán Foundation for Applied Research (prof. László Cser)

6.2.1. Visits of Staff Members to Foreign Institutions

- Kopčo, N.: Boston University, University of Connecticut Medical Center, Massachusetts Eye and Ear Infirmary – Harvard Medical School
- Paralič, J.: Vienna University of Technology, Austria
- Paralič, J.: University of Regensburg, Germany

6.3. Membership in International Organizations and Societies

- Kopčo, N.: Association for Research in Otolaryngology, Acoustical Society of America, International Neural Network Society
- Liguš, J.: EAEEIE – European Association for Education in Electrical and Information Engineering
- Ocelíková, E.; Sinčák, P.; Zolotová, I.: Czech Society for Cybernetics and Informatics
- Ocelíková, E.; Sinčák, P.; Zolotová, I.: CPRS - Czech Pattern Recognition Society
- Ocelíková, E.; Zolotová, I.: CSSS - Czech and Slovak Society for Simulation
- Paralič, J.: ACM – Association of Computer Machinery
- Paralič, J.: IEEE Computer Society
- Sabol, T.: Information Society Technologies Program Committee (IST PC), 5th Framework Program, Brussels
- Sarnovský, J.: INES - International Network of Engineers and Scientists for Global Responsibility
- Sarnovský, J.: Principia Cybernetica Web PRNCYB-L
- Sarnovský, J.: SWIIS - Supplementary Ways for Improving International Stability

6.4. Membership In Slovak Organizations and Societies

- The whole Department of Cybernetics and Artificial Intelligence is a team member of the Slovak Society for Cybernetics and Informatics
- Csontó, J.; Hladký V., Hric, M.; Hudec, M.; Chvál, J.; Kostelník, P.; Madarász, L.; Machová, K.; Novotný D.; Palko, M.; Paralič, J.; Sarnovský, J.; Sinčák, P.; Vaščák, J.; Hric, M.; Schwardyová, E.; Šamulka, M.: Slovak Artificial Intelligence Society
- Krokavec, D.: Slovak Electrical Engineering Society
- Krokavec, D.: Scientific Grant Agency of Slovak Republic
- Krokavec, D.: Member of the Editorial board of the journal Acta Electrotechnica at Informatica
- Ocelíková, E.; Sarnovský, J.; Zolotová, I.: Slovak Society for Cybernetics and Informatics
- Paralič, J.: Slovak Society for Computer Science
- Sabol, T.: Board of the Open Society Fund, Bratislava

6.5. Contracts, International Scientific Projects

- IST-1999-20364 "Web Technologies Supporting Direct Participation in Democratic Processes (Webocracy)", 2000-2003, Project Co-ordinator.
- 10063-CP-1-2000-1-PT-ERASMUS-ETNE project (a thematic network) "Thematic Harmonisation in Electrical and Information Engineering in Europe (THEIERE)", 2000-2003, goals: The whole aim is to get a harmonisation of the curricula in EIE throughout Europe in order to facilitate the exchanges of knowledge, students and teachers. This harmonisation will make possible the establishment of common accreditation, crediting and certification procedures. Project web page: <http://www.eaeie.org/theiere>
- Central European Exchange Programme for University Studies (CEEPUS CZ-103), mobility network - collaboration with: Czech Technical University in Prague, Czech Republic, Technical University Brno, Czech Republic, Slovak Technical University, Slovakia, Technical University Plovdiv, Bulgaria, Technical University Gabrovo, Bulgaria, University of Maribor, Slovenia, Technische Universität Wien, Austria, Technical University of Graz, Austria, Institute of Control Systems, Danube University of Telecommunication, Krems, Austria, University of Zagreb, Croatia, University of Zagreb, Croatia, University of Split, Croatia, University of Miskolc, Hungary, Kielce University of Technology, Poland and Lublin University of Technology, Poland; Duration: 2001 – 2003

7 THESES

7.1. Masters Theses

1. Andoga, R.: Modeling of object-based attention using artificial neural networks (Kopčo, N.)
2. Angelovič, P.: Use of neural networks with uncontrolled learning for prediction of time series (Sinčák, P.)
3. Babinec, Š.: Use of neural networks for prediction of time series (Sinčák, P.)
4. Babík, M.: Predictive system based on predictive modular neural networks (Sinčák, P.)
5. Babjak, J.: Optimization algorithm with distributed computation for algae simulator tuning (Csontó, J.)
6. Bača, M.: Application of Adaptive Algorithms for Dynamical Processes using PLC Controllers (Jadlovská, A.)
7. Balčák, T.: Design and Realisation of New Departmental Web Site. (Paralič, J.)
8. Barnák, B.: Remote Laboratory – Industrial Portal, (Zolotová, I.)
9. Belanský, F.: Control of System "A Body in a Tube" using AS-I Network (Jadlovský, J.)
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8 OTHER ACTIVITIES

- 4th Workshop on Data Analysis – a bilateral Slovak-Austrian student workshop (<http://www.ifs.tuwien.ac.at/~andi/wda/2003/>) has been organized in Malinô Brdo, Ružomberok, Slovakia, June 12-15, 2003
- Kopčo, N.: Spatial release from masking of chirp trains in a simulated anechoic environment. Invited talk at the University of Connecticut Health Center. July 23, 2003
- Sabol T. and Paralič, J. gave an invited talk within the 3rd International Conference Znalosti 2003, Ostrava, Czech Republic, February 2003.

9 PUBLICATIONS

9.1. Books

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2. PARALIČ, J.: *Knowledge Discovery in Databases*. Elfa, Košice, 2003, 80 p., ISBN 80-89066-60-7 (in Slovak)
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9.4. Other publications

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